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Serial No.: 09/240,524

Docket No.: KCC-14,026

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Robert James GERNDT et al.

Serial No.: 09/240,524

Filing Date: 29 January 1999

Title: FLUID DISTRIBUTION SYSTEM FOR
THERMAL TRANSFER ROLLERS

Group No.: 3743

Examiner:
Atkinson, C.

REPLY BRIEF UNDER 37 C.F.R. 1.193

Assistant Commissioner for Patents
Washington, D.C. 20231

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TECHNOLOGY CENTER R3700

Dear Sir:

In response to the Examiner's Answer mailed 05 November 2002,

Applicants respond as follows.

I hereby certify that this correspondence (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on

19 December 2002

19 Dec 02
Date

Eric Kirschke
Signature

I. Scannell Does Not Disclose All the Claimed Features of The Present Invention With The Exception of The Passage Extending Between The Inlet End and Outlet End of The Roller.

The Examiner alleges that Scannell in Figs. 1-3 and 5 discloses all the claimed features of the present invention with the exception of the passage extending between the inlet and outlet ends of the roller. As set forth by the Examiner in his Answer, Scannell, not the devices of Schönemann, Akiyoshi et al. and Marschke, is relied upon in the above rejection, to teach the inlet and outlet flow channels.

We continue to maintain our position that the prior art references were improperly combined. However, even if they were properly combined, the references do not render Applicants' claimed invention obvious in the manner required by 35 U.S.C. § 103. Scannell does not disclose all the claimed features of the present invention with the exception of the passage extending between the inlet and outlet ends of the roller. For example, Scannell does not teach or suggest: (a) a plurality of inlet channels in the inlet end chamber, each inlet channel having a first end closer to the passage and a second end closer to the annulus, wherein each inlet channel becomes progressively wider along a plane which includes a circumference of the inlet end chamber between the first end and the second end thereof, as required by independent Claim 1; (b) a plurality of inlet channels in the inlet end chamber, each having a wider end closer to the annulus and a narrower end further away from the annulus, wherein each inlet channel becomes

progressively wider along a plane which includes a circumference of the inlet end chamber between the narrower end and the wider end thereof and a plurality of outlet channels in the outlet end chamber, each having a wider end closer to the annulus and a narrower end further away from the annulus, wherein each outlet channel becomes progressively wider along a plane which includes a circumference of the outlet end chamber between the narrower end and the wider end thereof, as required by independent Claim 14; or (c) a plurality of inlet channels in the inlet end chamber, each inlet channel having a wider end closer to the annulus, and a narrower end, wherein adjacent inlet channels are separated by a wall having a substantially uniform thickness, as required by independent Claim 20.

Applicants respectfully submit that the Examiner has ignored critical claim limitations and over-simplified the present invention, when alleging that Scannell discloses all the claimed features of the present invention with the exception of the passage extending between the inlet and outlet ends of the roller. The thermal transfer roller of the present invention comprises an outer cylindrical shell and an inner cylindrical shell which is coaxially positioned within the outer shell to define an annulus between the inner cylindrical shell and the outer cylindrical shell, and a particularly configured roll journal positioned on each end of the thermal transfer roller. Each roll journal comprises an end chamber including a plurality of channels each extending outwardly from the passage to the

annulus and becoming progressively wider as it approaches the annulus. As each channel transitions into the annulus, a large transition area is provided by the widened channels to maintain a substantially even fluid discharge around the circumference of the annulus.

Scannell discloses a heat transfer roll 10 having an end section 20 forming a plurality of radial bores 40. Each bore 40 is aligned with a hole 44 through the wall of the inner tubular body 12, one hole 44 being positioned between each pair of ribs 14, and each bore 40 intersecting the axial bore 29 of the end section 20.

In an alternative embodiment, a long radial spacer 74 is positioned within a space between inner plate 72 and outer plate 70 such that the outer end of the radial spacer is adjacent hole 44. A short radial spacer 88 is positioned between the inner plate 72 and outer plate 70 and adjacent hole 44 opposing the long radial spacer 74. The outer end of each radial spacer 74, 88 abuts sealably against the inner surface of the inner tubular body 12 such that liquid passing to or from each hole 44 must pass through the constriction between the associated long and short radial spacers 74, 88. Scannell at Col. 5, line 68 through Col. 6, line 4.

Unlike the present invention wherein the channels facilitate a substantially uniform, even discharge of fluid into the cylindrical slots 34 entering the annulus (Fig. 2) or into a plurality of smaller openings 35 entering the annulus (Fig. 1), Scannell teaches the use of spacers positioned about a hole to provide a

tortuous or constricted path through which fluid flows. See Scannell at Figs. 5 and 7. Further, each channel 19 is in fluid communication with the axial bore 29 via **only one hole 44**. Due to the radial spacers 74 and 88 positioned about the one hole 44 to constrict the fluid flow through the hole 44, each channel 19 has an outlet hole 44 that is narrower than the inlet, i.e. Scannell does not teach or suggest a plurality of channels which progressively widen between a first end closer to the passage and a second end closer to the annulus, as required by Applicants' claimed invention.

Scannell does not disclose all the claimed features of the present invention, with the exception of the passage extending between the inlet end and the outlet end of the thermal transfer roller, as alleged by the Examiner. Further, the secondary references do not teach these features either.

Applicants respectfully submit that no *prima facie* case of obviousness has been made. Thus, Applicants respectfully request reversal of the rejection of Claims 1-25 under 35 U.S.C. § 103 as being unpatentable over Scannell in view of Schönemann or Akiyoshi et al. or Marschke.

II. The Channels Substantially Prevent The Heat Transfer Fluid From Assuming An Angular or Spiral Flow Pattern Within The Inlet Chamber.

In response to Applicants' arguments, the Examiner alleges that Scannell teaches an annulus formed between plates 12 and 18 in Fig. 2, having at least one spiral flow channel. However, the heat transfer roller of the present

invention prevents the heat transfer fluid from assuming an angular or spiral flow pattern **within the end chamber, particularly within the inlet chamber 28**, due to rotation of the roller. Applicants seek to overcome the problems associated with angular or spiral fluid patterns assumed by the heat transfer fluid in the end chamber and with uneven fluid distribution around the circumference of the annulus by providing a plurality of channels in the end chamber.

The inlet chamber 28, as well as the outlet chamber 38 of the thermal transfer roller 10 is provided with a plurality of channels 46, defined by walls 48 having a uniform thickness, extending radially outwardly from the passage 24 to the annulus 16; each channel 46 becoming progressively wider as it approaches the annulus 16. As each channel 46 transitions into the annulus 16, a large transition area is provided by the widened channels 46 to allow fluid to flow into the annulus 16. (See Specification at page 11, lines 14-17 and Fig. 1).

The channels 46 substantially prevent the heat transfer fluid from assuming an angular or spiral flow pattern within the end chamber, particularly within the inlet chamber 28, due to rotation of the roller. The channels 46 are also designed to facilitate a substantially uniform, even discharge of fluid into cylindrical slot 34 entering the annulus 16 (Fig. 2) or into numerous smaller openings 35 entering the annulus 16 (Fig. 1). This is accomplished in part by providing channels 46 with a wider end approaching the annulus, and a narrower end approaching the passage 24. This configuration permits the channels to be

immediately adjacent or very close to each other at both ends, and minimizes the amount of space not occupied by channels. By minimizing the distance between adjacent channels approaching the annulus, a substantially even fluid discharge around the circumference of the annulus is maintained.

As discussed above, Scannell teaches the use of radial spacers positioned about a hole to provide a tortuous or constricted path through which fluid flows. Because the fluid flow is constricted between the radial spacers 74, 88, the apparatus as taught by Scannell does not prevent the fluid from assuming an angular or spiral flow pattern nor does it facilitate a substantially uniform, even discharge of fluid into the annulus, as in the present invention. Thus, the channels 19 of Scannell are similar to conventional radial channels that are increasingly spaced apart as they approach the outer surface of the roller, providing uneven fluid distribution to the annulus. See Applicants' Specification at page 3, lines 15-19.

CONCLUSION

Applicants respectfully submit that the combination of Scannell with Schönemann, Akiyoshi et al. or Marschke relied upon for rejection is improper and further that the combination of references relied upon, if proper, would not render Applicants' claimed invention obvious in the manner required by 35 U.S.C. § 103. Accordingly, Applicants respectfully request the Board to reverse the rejection of Claims 1-25 under 35 U.S.C. § 103(a) as being unpatentable over Scannell in view of Schönemann or Akiyoshi et al. or Marschke.

Respectfully submitted,



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